

PREVALENCE OF SPORTS INJURIES AMONG FEMALE ATHLETES

Sumaiya Nasrin Bristi

Bachelor of Science in Physiotherapy (B.Sc. PT)

Roll No: 1612

Registration No: 1923

Session: 2010-2011

BHPI, CRP, Savar, Dhaka.



Bangladesh Health Professions Institute (BHPI)

Department of physiotherapy

CRP, Savar, Dhaka-1343

Bangladesh

August'2015

We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation

entitled-

Prevalence of Sports Injuries among Female Athletes

Submitted by **Sumaiya Nasrin Bristi**, for the partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B.Sc. PT).

.....
S.M. Ferdous Alam

Assistant Professor
Dept. of Rehabilitation Science.
BHPI, CRP, Savar, Dhaka.
Supervisor

.....
Md. Sohrab Hossain

Associate Professor of Physiotherapy, BHPI &
Head of Programs
CRP, Savar, Dhaka.

.....
Mohammad Anwar Hossain

Associate Professor of Physiotherapy, BHPI &
Head, Department of Physiotherapy
CRP, Savar, Dhaka.

.....
Md. Shofiqul Islam

Assistant professor
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka.

.....
Md. Obaidul Haque

Associate Professor & Head,
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka.

Declaration

I declare that the work presented here is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also declare that for any publication, presentation or dissemination of information of the study. I would be bound to take written consent from my supervisor and Head of the Physiotherapy Department, Bangladesh Health Professions Institute (BHPI).

Signature:

Date:

Sumaiya Nasrin Bristi

Bachelor of Science in Physiotherapy (B.Sc. PT)

Roll No: 1612

Registration No: 1923

Session: 2010-2011

BHPI, CRP, Savar, Dhaka - 1343

Bangladesh

CONTENTS

Page No.

Acknowledgement	i
Acronyms	ii
List of Figures	iii
Abstract	iv
CHAPTER: I INTRODUCTION	1-8
1.1 Background	1-3
1.2 Rationale	4
1.3 Research Question	5
1.4 Study objectives	6
1.4.a General objectives	6
1.4.b Specific objectives	6
1.5 Conceptual framework	7
1.6 Operational definition	8
CHAPTER: II LITERATURE REVIEW.....	9-15
CHAPTER: III METHODOLOGY.....	16-20
3.1 Study design	16
3.2 Study area	16
3.3 Study population	16
3.4 Sampling technique	16
3.5 Sample size	17

	Page No.
3.6 Inclusion criteria	18
3.7 Exclusion criteria	18
3.8 Data collection procedure	18
3.9 Method of data collection	18
3.10 Materials and tools	19
3.11 Duration of data collection	19
3.12 Data analysis	19
3.13 Ethical consideration	20
CHAPTER: IV RESULTS	21-34
CHAPTER: V DISCUSSION	35-37
CHAPTER: VI CONCLUSION AND RECOMMENDATION.....	38-39
6.1 Conclusion	38
6.2 Recommendation	39
REFERENCES	40-45
APPENDIX	46-52
Inform consent (English)	46
Inform consent (Bangla)	47
Questionnaire (English).....	48-51

Acknowledgement

First of all, I would like to pay my gratitude to ALLAH who has given me the ability to complete this project in time with success. The second acknowledgement must go to my family members who have always inspired me for preparing the project properly.

I am extremely grateful to my honorable and praiseworthy supervisor **S. M. Ferdous Alam**, Assistant Professor of Rehabilitation Science, BHPI, CRP, Savar, Dhaka for giving me his valuable time, his supervision and excellent guidance without which I could not able to complete this project.

I would like to express my gratitude to my honorable teacher **Md. Obaidul Haque**, Associate Professor and Head of the Physiotherapy Department, CRP, Chapain, Savar, Dhaka for providing me permission for data collection.

I would like to express gratitude to my honorable teachers **Md. Sohrab Hossain**, Associate Professor of physiotherapy, BHPI & Head of Programs of CRP, **Mohammad Anwar Hossain**, Associate Professor of physiotherapy, BHPI & Head of the Department of Physiotherapy, and all of my teachers for helping me in this study. I would also like to give my special appreciation to my respected teacher **Md. Shofiqul Islam**, Assistant Professor of Physiotherapy, BHPI for his proficient guidance to carry out this study. My special thanks to all the staffs of Exercise Physiology Department of BKSP. I am grateful to **Md. Bakhtiar**, Senior Physiotherapist & Head of the Department of Exercise Physiology, BKSP, Savar, Dhaka, other Clinical Physiotherapist, for their excellent accumulation throughout of this study.

I like to thanks my friends Shourav, Mustafij, Rasel, Parvez for help me to complete this project. I would like to thank the Librarian of Bangladesh Health Professions Institute (BHPI) and her associates for their kind support to find out related books, journals and also access to internet. Finally I would like to thank to all participants of the study for their enormous co-operation.

Acronyms

BHPI :	Bangladesh Health Professions Institute
BKSP :	Bangladesh Krira Sikkha Protisthan
BMI :	Body Mass Index
ACL :	Anterior Cruciate Ligament
PCL :	Posterior Cruciate Ligament
LCL :	Lateral Cruciate Ligament
MMT :	Manual Muscle Testing
PRICE:	Protection, Rest, Ice, Compression, Elevation
ROM :	Range of Motion
SPSS :	Statistical Package of the Social Sciences
BMRC:	Bangladesh Medical Research Council
WHO :	World Health Organization
IBM :	Institutional Review Board

List of Figures

	Page No.
Figure 1: Age of the participants	21
Figure 2: Educational level of the participants	22
Figure 3: Training events of injured participants	23
Figure 4: Duration of training among injured participants	24
Figure 5: BMI range of participants	25
Figure 6: Heart rate of the participants	26
Figure 7: Flexibility of the participants	27
Figure 8: Eating disorder of the participants	28
Figure 9: Participants site of injury	29
Figure 10: Type of injury of the	30
Figure 11: Percentage of recurrence among the participant	31
Figure 12: Warm up and cool down activity of the participant	32
Figure 13: Duration of warm up and cool down	33
Figure 14: Treatment of injured participant	34

Abstract

Purpose: To evaluate the prevalence of sports injuries among female athletes. *Objective:* To identify the prevalence of sports injuries among the female athletes, to expose the injured participants age, training duration and sporting event, to identify the common site and type of injury and recurrence and to ascertain the treatment after injury. *Methodology:* A quantitative cross-sectional study design was chosen to achieve the objectives of the study. 50 subjects were selected through convenience sampling technique from the injured female athletes who trained in BKSP by using a structural questionnaire to collect data. *Results:* The result of the study demonstrates that, the peak age group was 14 or less than 14 year (50 subjects, 60% in total subject). The most frequent sports injury was cricket 26%(n=13) and the less injury rate found who trained greater than or equal 6 year 2%(n=1). The end result also indicates most commonly injured area was ankle sprains 18% (n=9), The prevalence of eating disorder 18% (n=9) and among them higher rate was overuse injury 66% (n=33) and direct injury 34% (n=17). Among the participants 76 % (n=38) was under normal weight. Flexibility rate was 60 % (n=30) less than or equal 36 cm and heart rate was 70 % (n=35) at less than or equal 72 beat per minute .Among the participant 98% (n=49) were regularly attend in warm up and cool down activity and the duration of warm up and cool down 54% (n=27) more than or equal 16 min. Heart rate was 70% (n=35) less than or equal 72. The finding also reflects that the treatment was consisting physiotherapy as frequent as drug (38 % n=19 taken physiotherapy, 16% n=8 taken drug and 23% n=21 taken both). *Conclusion:* The vulnerable age range is over 14 or less than 14 were frequent injury occurring among athletes and noticeably flexibility and overuse are the key issues to cause of injury. Health education and perform regular physical activity along with physio therapeutic exercises can prevent injury.

Keywords: Prevalence, Sports Injury, Female Athletes.

1.1 Background

Sports plays a vital role for a nation to symbolize its national pride. Sports athletes are internationally recognized for their outstanding performance in international tournaments (Merlino & Perisa, 2012). Every year FIFA, ICC, Olympic committee and other sport organizations organize many sports events. World media puts huge importance and covers sports news (Junge et al., 2004). Couple of years earlier we considered sports only for entertainment. But in this present time, sport individuals take it as a profession. In the childhood level parents get their child admitted to the sports institute for making them future athletes. As a consequence, with the increasing number of population, the numbers of sport athletes are also increasing (Yoon et al., 2004).

Injuries are the major threats to all the athletes of the world. As we notice in daily newspaper sports injury causes great suffering both the male and female athletes all over the world (Shadanfar, 2011). Many great athletes were unable to participate in the great event because of being injured, we see in the world athlete history. This problem is more acute among Bangladeshi athletes (Hawkins & Fullar, 2006). World population has increased in a great number, popularity of popular games also increased, as a result more and more people are becoming interested in athletics of sports. The number of sports institute are growing, they are arranging frequent sport event. Before participating in a sport event participant requires heavy training; during this training session, and while they participate, this sport athletes starts realizing the necessity of physiotherapy to overcome the injury and keep body fit for the games(Pecina & Bojanic, 2007).

Sports injury is identified and observed all over the world. According to Beers & Robert (2004), In America, about 1.3 million American female athletes suffered from sports injury. Of those 53% were minor enough to be self-treated or left untreated. However, about 1 million Americans annually receive medical attention for their

sports-related injuries. That equate to almost 26 per 1,000 people (Yoo et al., 2010). The rates of injury are more among those who participate in the contact sport but who are involved in individual activity they face serious injury. It is mentioned that, Baseball causes sport related trauma in the United States with 68% of injuries caused by contact with the ball or player-player collision or being hit by instrument (Whieldon & Cerny, 1990). It is difficult to determine the extent, if any, to which inherent characteristics (for example, biomechanical faults) are responsible for existing injury patterns among females. If girls were encouraged to develop their full physical potential from birth, and if their coaches and trainers were fully informed regarding the best methods of conditioning and injury prevention, present injury patterns among female athletes might change dramatic (Freddie et al., 2001).

In Germany different aspects of epidemiology and prevention have been found in a sport injury reports of athletes 200,883 athletes are taken as sample, a survey is driven among their sport injuries (Orchard et al., 2006). About two third of the injuries are occurred in soccer, handball, basketball, and volleyball. By this time, the number of women soccer player's injury has risen from 7.5 to 15.6 %. Ankle injuries have decreased from 28.7 to 16.9 %. By contrast, the rate of knee injuries has increased from 28.4 to 20.3%. Days of disability have stopped steadily since the 1990s. Impatient hospital days have decreased from 10 to 5 days, whereas the share of injuries that needed surgery increased from 30 to 40% (Yoo et al., 2010).

Female athletes have higher injury rates and risks of injury than male athletes. The athletes were followed for 884,339 athlete hours of exposure. Overall, 966 injuries occurred; the girls had 515 injuries and the boys had 451 injuries. In terms of more minor injuries, girls had more injuries than boys. Of the more major injuries (seven or more days lost), girls had more injuries in basketball and soccer, but boys had more baseball/softball injuries (Restolainen et al., 2009).

In this present time by the increasing number of female athletes, physiotherapists working scope is widening. Physiotherapists are applying more specific methods based on researched evidence and result and developing their therapy. Female athletes

are also becoming more conscious of their injuries (Orchard, 2013). However, no records are recorded when injuries happened to the athletes every day, no organization is conducting research and sponsoring these action. As a result, having enough document or evidence becomes difficult. But this research may help those who will study on the same field and solving female athlete's injury problems (Otis et al., 2005).

1.2 Rationale

Injury to the athletic trainees is common and most of the time these are over look by the training authority. Throughout the world, female athletes are not in a large number as male and having less effort to training, practice and competition schedules. The purpose of this study is to evaluate the importance of establish pre-participation physical screening/examination although neuromuscular and proprioceptive training program activity for a female athlete in Bangladesh which may enhance the athletic performance of female athlete.

Crisp et al. (2001) found that the most commonly injured area of a female athlete is shoulder and knee. So, this study will also used to review the common injuries reported, identify the potential risk factors for future injury and gain a better understanding for a health professional deals with the female athletes about the physical characteristics. In our country there is no such study about common injuries among female athletes and their management. So this study will introduce a problem oriented training program to prevent the common injuries and to develop evidence based project study to strengthen physiotherapy profession.

According to Freddie et al. (2001), therapeutic management of athletes should begin before any injury occurs. Until now Bangladesh is behind addressing physiotherapy measures for female athletes in comparison to other countries. This study also will be helpful in making physiotherapist to aware about the musculoskeletal problem of female athletes and create an opportunity to work on sports background.

1.3 Research Question

What is the prevalence of sports injuries among female athletes?

1.4 Objectives of the study

1.4.a General objectives

To identify the prevalence of sports injuries among the female athletes.

1.4.b Specific objectives

1. To expose the injured participant's age, training duration and sporting event.
2. To identify the common site of injury.
3. To extract the types of injury.
4. To identify recurrence of injuries among female athletes.
5. To know about the management of injury (medication, physiotherapy or both).

1.5 Conceptual Frame Work

Independent variable

Socio-demography:
Age
Education
Participating event
Training age

Health related characteristics:
Height
Weight
BMI
Flexibility
Heart rate
Posture
Eating disorder
Menstrual disturbance

Injury related question:
Warm up-cool down
Mental stress

Dependent variable

**Sports
Injury**

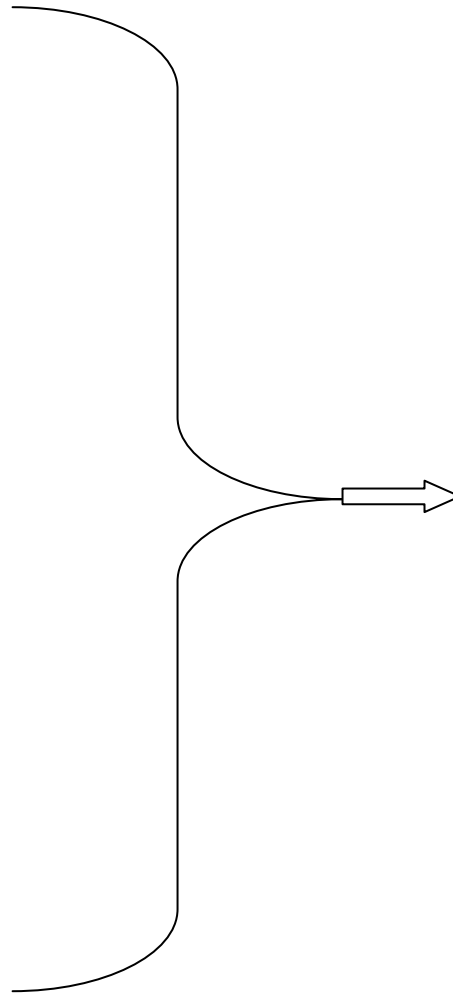


Table: List of variables

1.6 Operational Definition

Prevalence: The degree to which something is prevalent, especially the percentage of a population that is affected with a particular disease at a given time.

Sports Injury: Common types of sports injuries are broken bones, soft tissue lesion (laceration, abrasion, contusion) poisoning and burns. Injury results from harmful contact between people and objects, substances or other things in their surroundings. Sports injuries result from acute trauma or repetitive stress associated with athletic activities. Sports injuries can affect bones or soft tissue (ligaments, muscles, tendons).

Female athletes: A person trained to compete in sports or exercises involving physical strength, speed, endurance or a person who has natural aptitude for physical activities are athletes. Those who are female participants involved in athletic activity are called as female athletes.

Athletics is an exclusive collection of sporting events that involve competitive running, jumping, throwing, and walking. The word “athletics” is formed adding the suffix “ics” with “athletic”. Athletics is the moderate replaced form of Gymnastics. Usually used with a plural verb like athletic sports, as running, rowing, or boxing. In British, track and field events. Normally, used with a single verb, the practice of athletic exercise; the principles of athletics training (Freckleton & Pizzari, 2013). A person or individual who takes part in these activities with his mental and physical ability is termed as an athlete. Female Participants of these activities are female athletes (Hirst et al., 2007).

Female’s participation in athletics has increased admirably; last few decades are remarkable to observe the change. Female athlete’s number as changed in great number, the prevalence of female athletes injury also increased in large numbers (Restolainen et al., 2009). Injuries are the most important factors in sports. Besides, female athlete’s physiological and anatomical structure is quite diverse from the male athletes. Like, lower limb comprised 56% in case of men and women comprised 51.2 % (Eirale et al., 2013). The woman has shorter structure and wider pelvis which gives them lower centre of gravity and affect in balance more over the women have increased joint laxity and it gives more profuse joint capsule and made the joint more vulnerable to injuries and also the women have small heart and for this reason women have low systolic pressure which leads to decrease effectiveness in both aerobic and anaerobic performance of women and make the women more susceptible for getting injury (Hassabi et al., 2010).

In comparison with the injury rates in high level men’s football tournaments, the incidence of injury reported here is substantially lower than the average incidence reported in 12 major international tournaments (Junge et al., 2004), in the 2002 FIFA World Cup and the 2000 Asia Cup (Yoon et al., 2004). There was a trend towards an increasing rate, from the world cups to the Olympic Games to the U-19 world

championships. This could be interpreted as the younger or the less experienced players being more likely to be injured during a international competition. A similar trend has been observed in men's tournaments. Thus, in the rest of the discussion, the incidence of injuries in female and male football players will be compared with respect to the particular type of tournament (Junge et al., 2004).

Most injuries in the present study will occurs following contact with another player as reported previously for match injuries in men (Arendt & Dick, 2006). But in contrast with the corresponding tournaments for men, in which at least half of the contact injuries have been reported to be caused by foul play, only a third of the contact injuries in the present study were caused by foul play. Thus, it seems that the mechanisms of injury differ substantially between male and female football players. Future studies should investigate this important aspect, using video analysis of tackling behavior and injury situations. This method has provided valuable information regarding this (Hawkins & Fullar, 2006).

Eating disorders are especially common among athletes and frequently the competition athletes participating in activities that emphasize leanness for performance and appearance are at a significantly greater risk. Male also develop eating disorders but at a much reduced incidence (approximately 90% female, 10% male) (Bahr & Holme, 2003). Athletes want to get fit, lose weight, excel in his or her sport, but then lose control and ends up with body and spirit ravaged by starvation, overindulge eating, and frantic compulsive exercise. She finds herself in a sports climate that may overvalue performance, low body fat, and an idealized, unrealistic body shape, size, and weight. Thus, gymnasts, long-distance runners, divers and figure skaters are more prone to developing eating disorders and related problems than those who participate in non weight-restricting sports such as volleyball or football (Petrie, 2006). In a survey of collegiate athletics conducted in 1992, 93% of the programs reporting eating disorders were in women's sports (Sherman et al., 2009).

Injuries can unfortunately occur in organized sports, exercise and other physical activities. Women are increasingly involved regular folks who happen to get the same

injuries as professional male athletes. In fact, women are even more susceptible to some injuries than men in the sports (Dhillon et al., 2012). Variation of age influence athletic injury due to anatomical and physiological changes in injury is among age five to fourteen years old (59.3 per 1,000 people). As many as 20% of female who play sports get hurt, and about 25% of their injuries are classified as serious. More than 775,000 boys and girls under age 14 are treated in hospital emergency for sports-related injuries (Zelisko et al., 2008). Between one-half and two-thirds of childhood sports injuries occur during practice, or in the course of unorganized athletic activity. According to the Centers for Disease Control and Prevention- more than 46,000 female athletes age 19 and younger experienced a sprain or strain of the ACL in 2006 to body. The highest rate of the plantar fascia is a wide, elastic ligamentous tissue that spends bottom of the foot. This tissue can become strained from overuse, unsupportive footwear, a tight achilles tendon or running on hard surfaces. The cause of plantar facilities is chronic irritation. Running and jumping activities with repeated landings can make an athlete susceptible to plantar facilities or tendo-achilles rupture (Halabchi et al., 2007). Athletes in cross-country, track and field events, basketball and volleyball are prone to this injury. Icing, correct shoes, shoe inserts or orthotics combined with flexibility and strength exercises can usually control, prevent or eliminate the condition prescribed by the physiotherapist (Spreeyn, 1985).

Two hundred and forty adolescent female athletes were recruited from a county public school district in Kentucky, USA with five middle schools and three high schools. Participants were evaluated by a physician for prevalence of PFP (n=39) and other exclusionary (N=49) criteria prior to the surveillance period. PFP was operationally defined as retro-patellar or peri-patellar pain around the patello-femoral joint (Hagen et al.,2000). At screening, participants were also evaluated for anthropometrics, lower extremity strength and landing biomechanics (DVJ) prior to their basketball season. Participants (N=152; 4 excluded at postseason follow-up) were monitored by certified athletic trainers for PFP during their competitive season. Fourteen participants developed incident PFP during the competitive season (Baumhauer et al., 2005).

Physical therapists, athletic trainers, and others involved in the athlete's care often recommend weight-bearing and non weight-bearing stretching exercises for the gastrocnemius-soleus complex to restore dorsiflexion after lateral ankle sprain (Dugan, 2005). More study of talocrural joint restrictions and the risk of re-injury following lateral ankle sprain is clearly needed, results and those of a restriction of talocrural arthrokinematics may be common following lateral ankle sprain; the restriction may persist despite restoration of dorsiflexion range of motion; and treatment of such restrictions may need to be considered in the rehabilitation following lateral ankle sprain (Evan, 1994). A more rapid restoration of dorsiflexion range of motion and normalization of gait in patients treated with posterior talar mobilization following lateral ankle sprain. Their findings suggest that an anterior displacement of the talus or a loss of posterior talar glide, or both, may occur following a lateral ankle sprain. Loss of dorsiflexion range of motion is a common observation following lateral ankle sprain and has been suggested to be a risk factor for reinjury (Joshi & Kotwal, 1999).

The injury rate was not different compared to male soccer, but knee injuries were more common compared to male counterparts according to a recent Norwegian study (Nadler et al., 2010). A major knee injury in many cases cause severe consequences such as an interrupted sports career, the risk for an early developing knee osteoarthritis with permanent disability for the player must also be considered (Sperryn, 1985). Anatomic and training related factors have been discussed as explanations for the higher risk for knee injuries in female players. Conceivable anatomic factors are the wider pelvis, the more spherical shape of the femoral condyles, the narrower inter-condylar notch, and the increased general joint laxity in females compared to males. The menstrual cycle might influence the injury rate for ACL injuries. Training related risk factors in females that have been discussed are the possible deficient of muscular control, insufficient muscular strength, a possible imbalance between strength and mobility of the lower extremities and low aerobic endurance (Wojtys et al., 2008).

In New Zealand, cricket is very popular sports and enjoyed at competitive and social level. Cricket is a sport where injury to the head and neck region occurred frequently but still seems as an emergency area for injuries. Over 11 year with 561 players and among them 40 players get maxillofacial injury (Lee, 2012). Maxillofacial fracture occurred frequently in cricket and the mechanism of injury was direct impact of ball (55%), collision between players (5%), and instrumental hit (2.5%). In this study it was found that a high proportion of fracture in facial region and this result give reinforcement to the player to take proper protection (Chan, 2007). Dr. Templeton tells us about six common injuries of female athletes, these factors in which proportion we see in our country's female athletes is an important point, these are-The anterior cruciate ligament (ACL) is one of the four ligaments that holds your knee together, and women are eight times more likely than men to tear it. Any activity that requires sudden side to side movement, like playing tennis change direction during playing football can lead to a tear. He suggests, decrease your risk by strengthening your hamstrings, stretching, and doing agility exercises.

Some studies showed that adult women may especially be at risk of concussion due to their smaller frames and neck muscles. Risk for concussion may increase with age since brain matter shrinks over time and there's more room for it to bounce upon impact. If you experience headache, dizziness, or nausea after a knock to the noggin, call your doctor (Giza et al., 2005).

Running will get athletes in shape, but it can also wear down the cartilage underneath kneecaps, resulting in the throbbing pain of runner's knee. When women run, their hips tend to turn inward and the muscles in the thighs turn at an angle, putting stress on the knees, Guide plain of this injury by buying shoes with proper support and strengthening thighs in the gym with leg exercises (Templeton et al., 2012).

Jumping into a walking or running program too quickly can lead to a stress fracture. These small cracks in the bone typically occur in the shin and result in pain and tenderness in the lower leg. Women may be more vulnerable because of their lower muscle mass and bone density, both of which decrease with age. Avoid this injury by

easing into exercise and stopping when feel pain, proper shoes and a diet rich in calcium and vitamin D is key (Brukner & Khan, 2006).

Poor knees can suffer to the meniscus or the cushioning cartilage between thigh and shin bone. Contact sports are typically to blame for a torn meniscus, but any twisting of the knee even from just getting out of a chair can do it (Yoo et al., 2010). Some points to manage the injury of the female athletes minimize initial injury, decrease pain and swelling, prevent further tissue damage and maintain flexibility. For gaining these functionally rehabilitate injured patient to enable return to activity, assess and correct any pre disposing factors to decrease the like hood of recurrence (Yoo et al., 2010).

Physiotherapy has a wide spectrum role to manage or improve the athletic injury related conditions. Several studies have revealed that physical fitness is associated with dramatic reductions in all causes of mortality, while patients and physicians alike are most familiar with the positive cardiovascular affects of exercise; the benefits extend beyond the heart. Increased physical activity is associated with additional benefits such as, decreased risk of diabetes, breast cancer, and even depression (Hall & Brody, 1999). Starting a regular exercise routine in adolescence can have a huge effect on overall health status later on. It has been shown that high school female athletes who are active in sports have higher graduation rates, fewer unwanted pregnancies, and greater self-esteem than those who are not active. Physical activity positively influences almost every aspect of a young woman's health from her physiology to her social interactions and mental health (Freddie et al., 2001).

Probable Benefits of Exercise in Females: Decreased "risky" behavior including involvement with drugs, smoking and teen pregnancy, improved self image, self esteem and mental health, improved bone mineral density with decreased long term risk of osteoporosis, improved lipid profile and control of obesity, less dysmenorrheal and premenstrual tension syndrome, improved immunity, improved glycemic control and prevention of type 2 diabetes, decreased all-cause mortality, decreased risk of coronary disease, cardiac events, and death, slower progression of early carotid

atherosclerosis and a reduction in stroke risk, improved blood pressure control, decreased rate of cholelithiasis, modest protection against breast cancer, decreased disability and improved cognitive function and autonomy in older women, decreased health-related costs(Peterson & Renstrom, 2001).

Components of the Musculoskeletal Physical Exam: Inspection – look for deformity, ecchymosis, muscle atrophy, palpation– feels for swelling/effusion, tenderness, warmth. Range of motion (ROM) test for pain/disability with both active and passive motion. Manual muscle testing (MMT) evaluate for weakness (and pain) by resisting muscle action (Kumar & Clark, 2002). Special tests check the integrity of a specific structure (ligament, cartilage, tendon, bone) by challenging its function or by “aggravating” the structure and reproducing pain. Neurovascular tests– In acute injury, rule-out nerve and vessel damage, in overuse injuries, evaluate for associated or contributing neuropathy (Trog et al., 2005).

Physiotherapy Management of injury among athletes: PRICE (Protect, Rest, Ice, Compress, Elevate) is initiated to: Minimize initial injury, decrease pain and swelling, prevent further tissue damage, and maintain flexibility, strength, and proprioception, and overall fitness during healing, functionally rehabilitate injured patient to enable return to activity, assess and correct any predisposing factors to decrease the likelihood of recurrence (Yoo et al, 2010).

To manage of an athletic injury by physiotherapy plays a fundamental role by delivering proficiency in the concept of preventive and curative rehabilitation for injured athletes. Therefore, it needs to begin physiotherapy as first choice of conservative treatment for our female athletes following of the country (Beers & Robert, 2004).

3.1 Study design

This study had done through using cross sectional prospective survey under a quantitative study design. This methodology was chosen to fulfill the aim of the study as an effective way to collect data. For conducting the research work, in the form of a retrospective type of survey design quantities research model is used. Survey is a way to research where information is collected from a large number of people using interview or questionnaire, by which a complete picture of the group can be found in the fact of any characteristics which fulfils the demand and purpose of the research. This research analyzes different facts, events, similar points to find result and drawing a calculative decision. For this, retrospective approach is taken to conduct this research work.

3.2. Study site

The study was conducted at Bangladesh Krira Shikkha Protisthan, Savar, Dhaka. Researcher chosen this organization as study site because this is the only institute which aims to find out the promising sports talents among young boys and girls in our country to provide adequate facilities and opportunities for their intensive training. And this institute directly conducted by the ministry of youth and sports.

3.3. Study population

The study population were the female athletes of Bangladesh Krira Shikkha Protisthan who had injuries in between last 2 years.

3.4. Sampling technique

Samples was selected by convenience sampling technique, because the female athletes remain in various tournaments on national and international level throughout the year and in convenience sampling technique are chosen to meet them easily.

3.5. Sample Size

The equation of sample size calculation are given below-

$$n = \left\{ \frac{Z \left(1 - \frac{\alpha}{2} \right)}{d} \right\}^2 \times pq$$

Here,

$$Z \left(1 - \frac{\alpha}{2} \right) = 1.96$$

P= 0.20 (Here P=Prevalence and P=20 %)

q= 1-p

$$=1-0.20$$

$$=0.80$$

d= 0.05

According to this equation the sample should be more than 246 people but due to lack of accessibility and time the study was conducted with 50 female athletes by convenience sampling.

3.6. Inclusion criteria

1. Only female athletes
2. Who had sports related soft tissue injury
3. Who had injuries in between last 2 year.
4. Age group: no specific age group.

3.7. Exclusion criteria

1. Female athletes those who are not injured.
2. Athletes who are not willing to participants.

3.8. Data collection procedure

Though there was several ways of collecting data, it was easy and reliable if the questionnaire completed or filled up in the presence of the researcher (Bailey, 1997). Subjects were chosen under convenience sampling procedure and the data was taken from the previous documents and filled up the questionnaire form by the researcher. In the questionnaire participant's socio-demographic information including age, level of education, training age, health and history including their injury were asked. Data collection was one of the most crucial parts of research. For this study data collection includes- method of data collection, materials used for data collection and duration.

3.9. Method of data collection

The data was collect from the institution BKSP. Data was collected by using a close ended structured questionnaire. Questionnaire is used, because it is still a very popular and very useful technique of data collection within the health care area (Hicks, 2009). The aim of the study was to identify the prevalence of sports injury among female athletes. So, it is easier to identify these problems by using questionnaire than any other methods. The strength of structured questionnaire is the ability to collect unambiguous and easy to count answer leading to quantities data for analysis (Bowling, 1998). So, Structural questionnaire is the most suitable way for data collection.

3.10. Materials and tools

The materials and tools for this study were consent form, questionnaire, pencil, pen, pages, file, tape, laptop, modem and SPSS (Statistical Package for the Social Sciences) software-16 version to analyze data.

3.11. Duration of data collection

Data was collected within 4 weeks of time. Data was collected carefully as much as possible from the field data. To collect data necessary time was taken, for each sample. This time varied for each participant. In general, each questionnaire took approximately 10-15 minutes to complete.

3.12. Data Analysis

Data was analyzed with the software named Statistical Package for Social Science (SPSS), version 16.0. And descriptive statistics was used to analyze data because a descriptive statistics refers methods of describing a set of results in terms of their most interesting characteristics (Hicks, 2009). The variables were labeled in a list and a researcher is keeping a computer based data record file. And after calculation; data is presented by using bar graph, pie chart and table by using Microsoft Office Excel 2007.

3.13. Ethical Consideration

The ethical guideline of WHO (World Health Organization), IRB (Institutional Review Board) & BMRC (Bangladesh Medical Research Council) was strictly followed. The research proposal was submitted to the ethical review committee of Bangladesh Health Professions Institute (BHPI) for approval & to CRP's ethical committee for getting permission for data collection. After the proposal was approved to carry on with the study the researcher had moved the study. Then collect the approval to carry out with the study from Bangladesh Krira Shikkha Protisthan (BKSP). Data collection was started and completed within the allocated time frame. Initially a consent form was given to each participant. This form explains the title, objective, confidentiality & anonymity of the research project. The participant was also informed that, they were free to withdraw at any time. The researcher was assured them that it would be never harmful for them & it would never affect in their lives. Otherwise they would not give the right information. The researcher also assured that their information will keep in a secured place. The interview notes and recording words would not be shared or discussed with others. It was being explained to all the participants that their personal identity was to be kept confidential, their name & address was not be written, except for social number or a pseudonym. Before participating in the study the researcher had provided them a written consent form to sign, responsible physiotherapist sign as a witness. The researcher had also signed in the consent form. Only principle investigator had the access of that information. The raw data destroyed after the completion of the research & all the data on computer file were deleted.

Finally the study was reviewed & appropriate by the authorities. Considering all those ethical norms & values no ethical problem arises as there were some personal & sensitive questions. The participants were informed that they have the right to withdraw consent & discontinue participation at any time.

The purpose of the study was to find out the prevalence of sports injuries among female athletes and to achieve this goal the result need to calculate and analyze in a systematic way and the result or analyzed data represent by bar graph and pie charts.

4.1 Socio-demographic Information

4.1.1 Age

The pie chart shows, among 50 participants the highest number of injured participants 60% (n=30) were found in the age group- ≥ 14 years and 40% (n=20) participants, their age is ≤ 15 years (Figure 1).

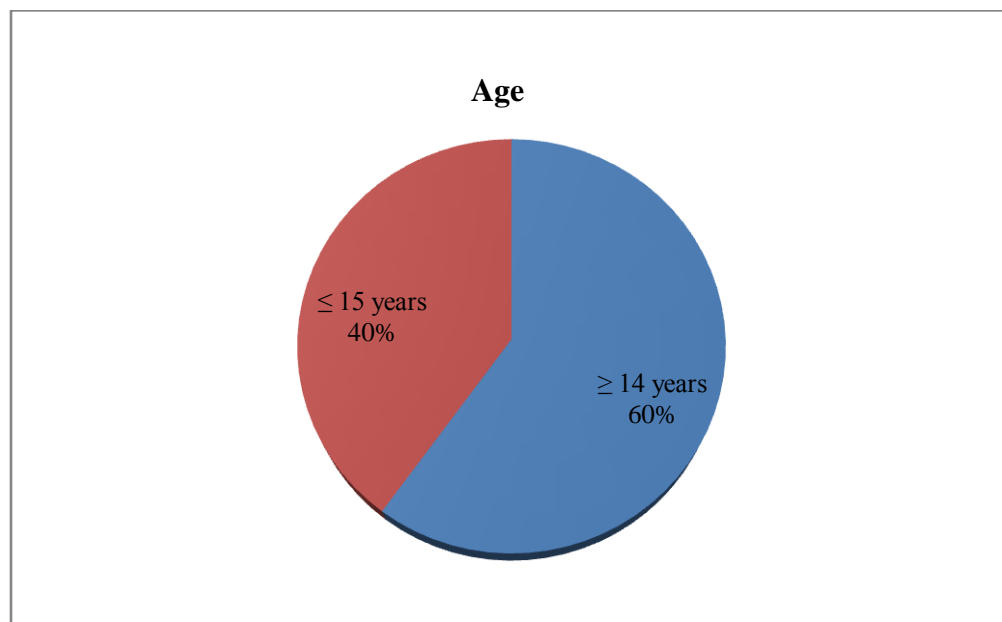


Figure 1: Age of the participants

4.1.2 Educational level

The pie chart shows, higher rate of injured athletes 38% (n=19) educational background is in the secondary school certificate, 34% (n=17) were in level of junior school certificate, 14% (n=7) in the higher secondary level, 14% (n=7) injured trainees undergoes primary school certificate level at Bangladesh Krira Shikkha Protisthan (Figure 2).

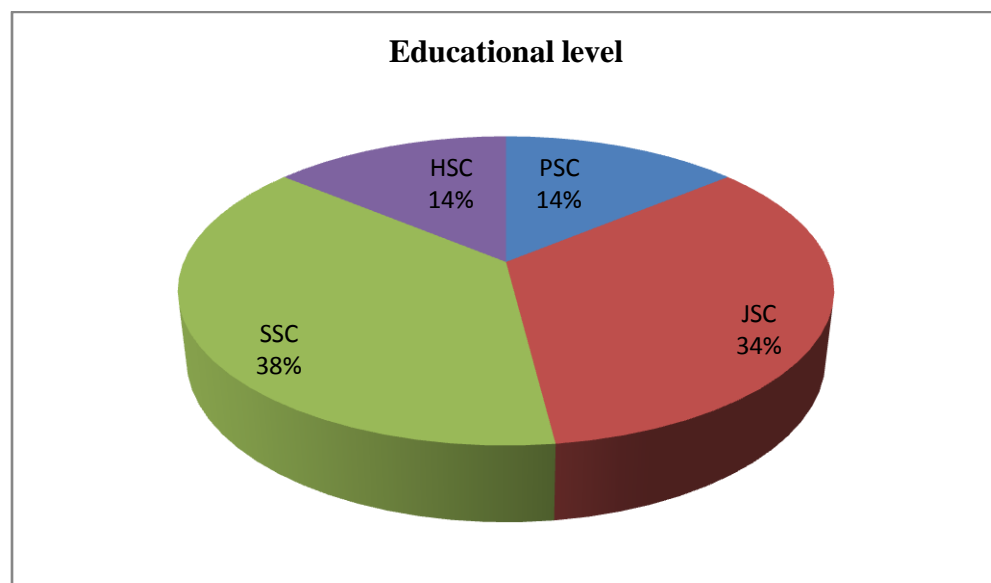


Figure 2: Educational level

4.1.3 Training event

The bar graph shows that the highest number of injured participants 26% (n=13) are cricket trainee, in swimming, gymnastic and running equal percent 16% (n=8) of injured trainee, in shooting 14% (n=7), 6% (n=3) percent injured trainee are in archery, and in other sport 6% (n=3) trainee injured (Figure 3).

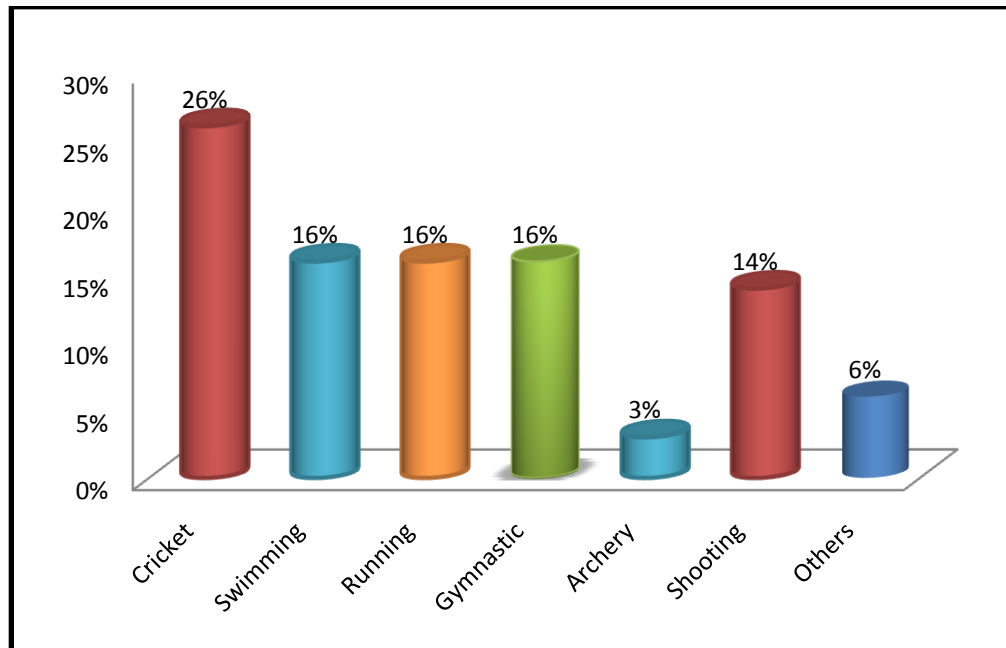


Figure 3: Training events of injured participants

4.1.4 Duration of activity of participants

The study was conducted 50 participants who are injured, in the bar graph higher number of injured participants undergo 2 years 32% (n=16), 3 years 22% (n=11), 4 years 18% (n=9), 5 years 16% (n=8), 1 years 8% (n=4) and less than 1 years and 6 years 2% (n=1) duration of training (Figure 4).

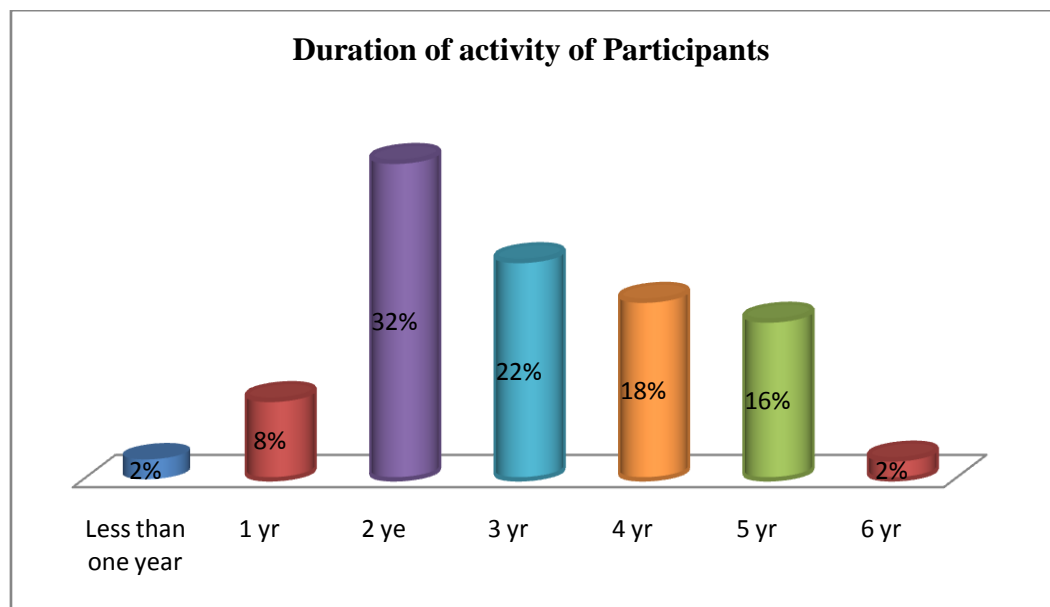


Figure 4: Duration of training among injured participants

4.2 Health related characteristic of the participants

4.2.1 BMI of Participants

Under the observation it was found that there were 18% (n=9) underweight, Normal weight 76% (n=38), overweight 4% (n=2), obesity 2% (n=1) (Figure 5).

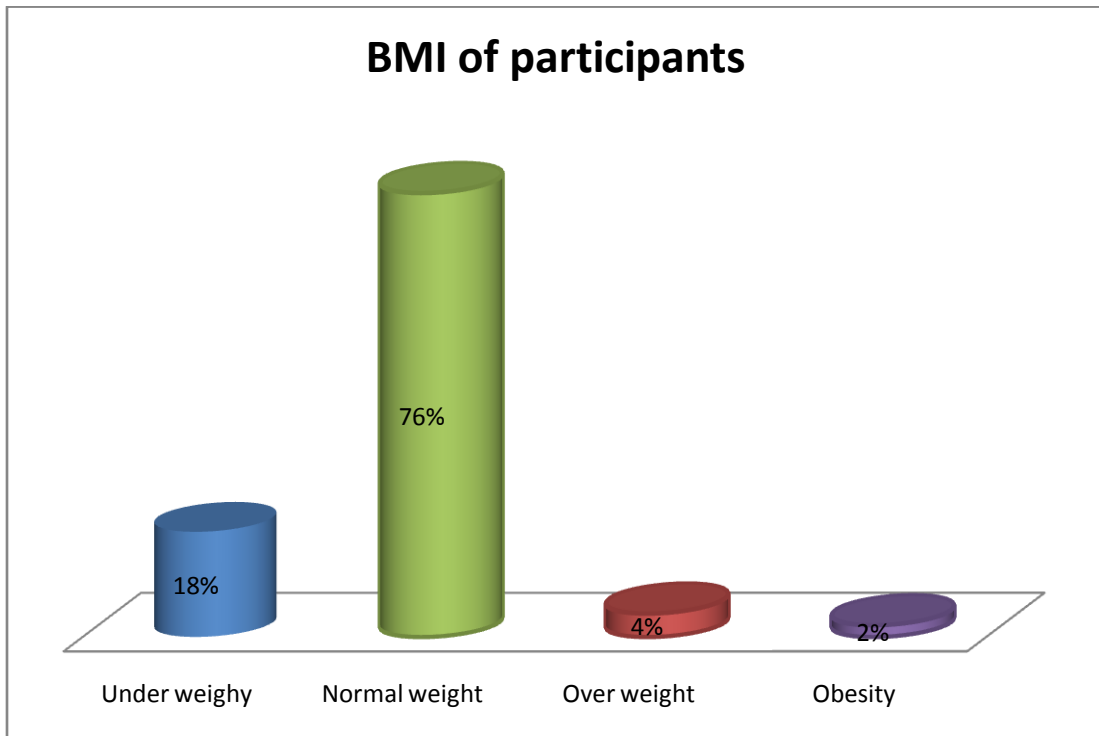


Figure 5: BMI range of participants

4.2.2 Heart rate of participants

The participants it was found that 70% (n=35) heart rate was 72 or less than 72 and 30% (n=15) had 73 or more than 73 (Figure 6).

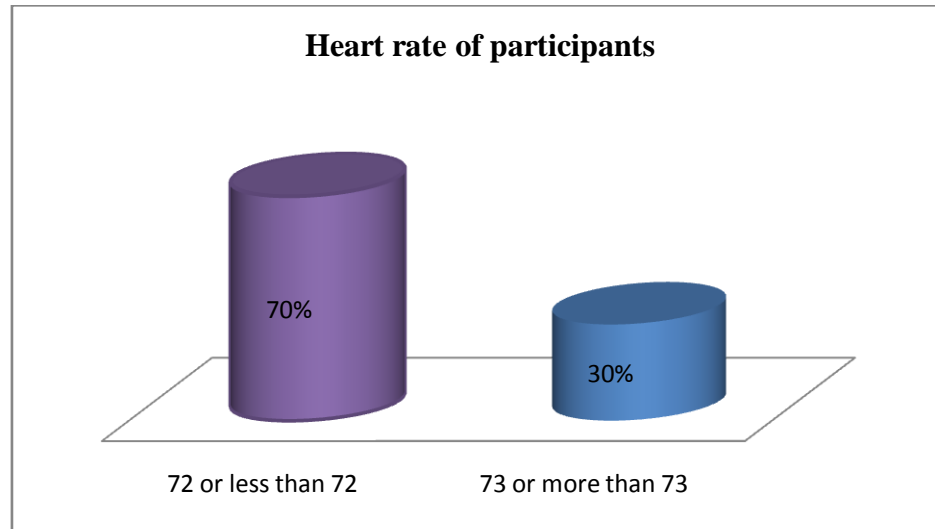


Figure 6: Heart of participants

4.2.3 Flexibility of Participants

Among the participants 40% (n=20) had flexibility ≤ 36 cm, and 60% (n=30) had ≥ 37 cm flexibility (Figure 7).

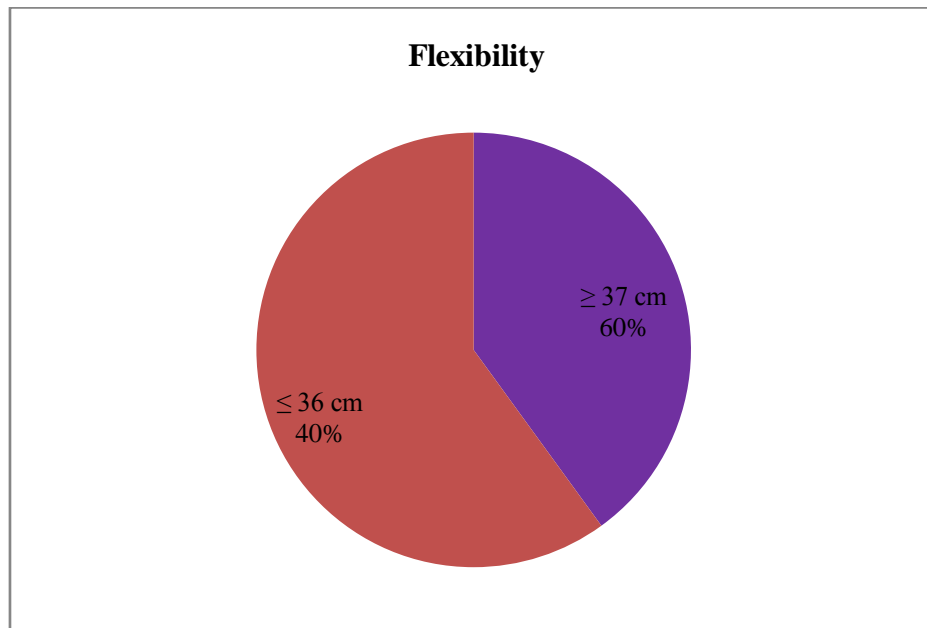


Figure 7: Flexibility of the participants

4.2.4 Eating Disorder of Participants

All 50 participants 18% (n=9) were suffering from eating disorder and 82% (n=41) did not (Figure 8).

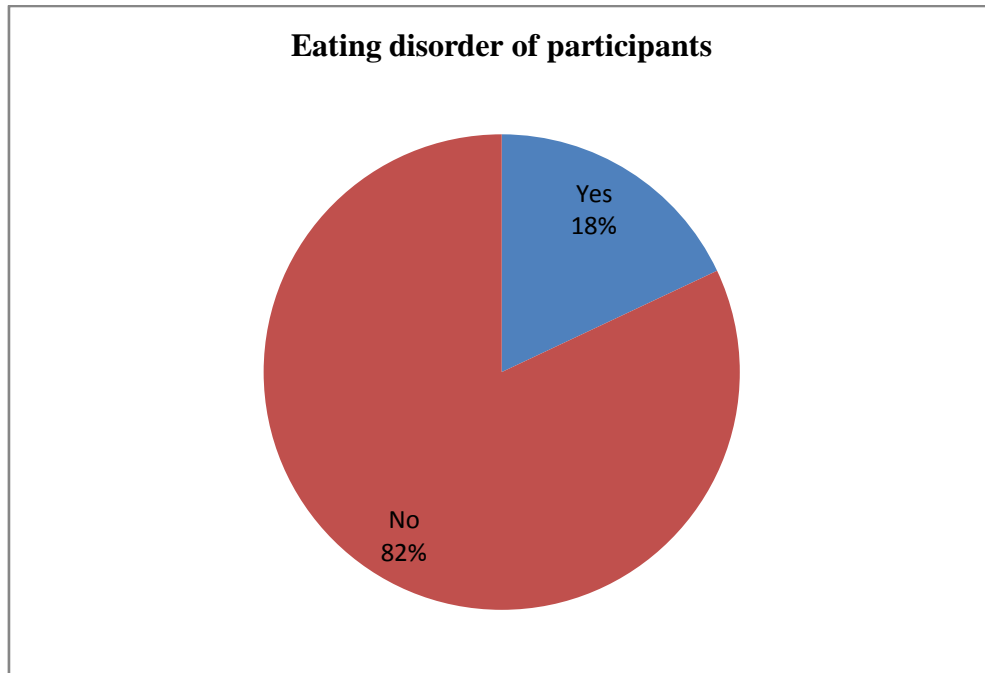


Figure 8: Eating disorder of participants

4.3 Injury related information

4.3.1 Participants site of injury

Among all 50 participant higher number 18% (n=9) participants injured by ankle sprain, rotator cuff injury, wrist injury and ACL injury 14% (n=7), PCL injury and Tennis elbow 10% (n=5),4% (n=2) head and neck injury, hip dislocation 2% (n=1), hamstring strain and quadriceps strain 6% (n=3), 4%(n=2) head and neck injury and Tendonachilis rupture 2% (n=1) (Figure 9).

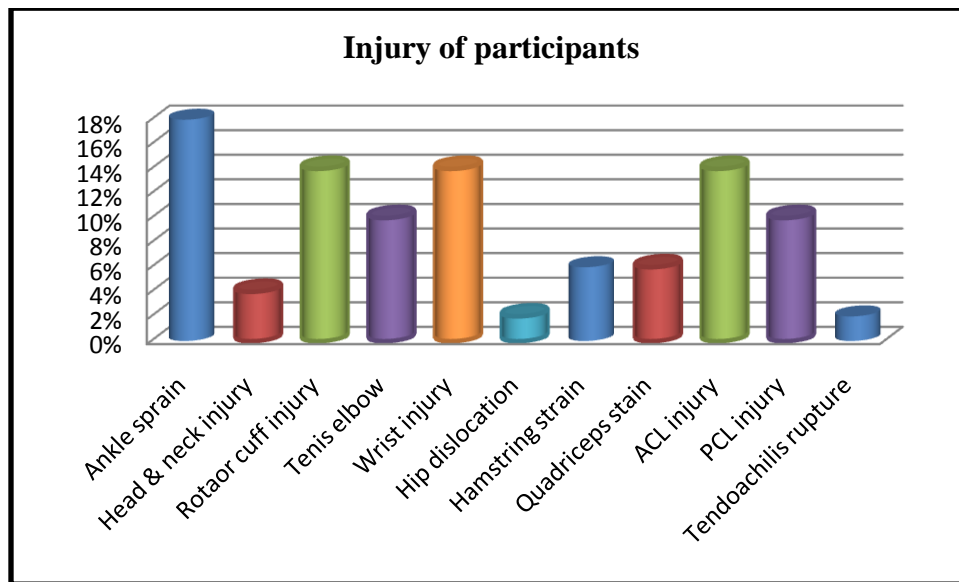


Figure 9: Participants site of injury

4.3.2 Type of Injury of the participants

Participants of Bangladesh Krira Shikkha Protisthan were most commonly affected by overuse injury 66% (n=33), and others were affected by direct injury 34% (n=17) (Figure 10).

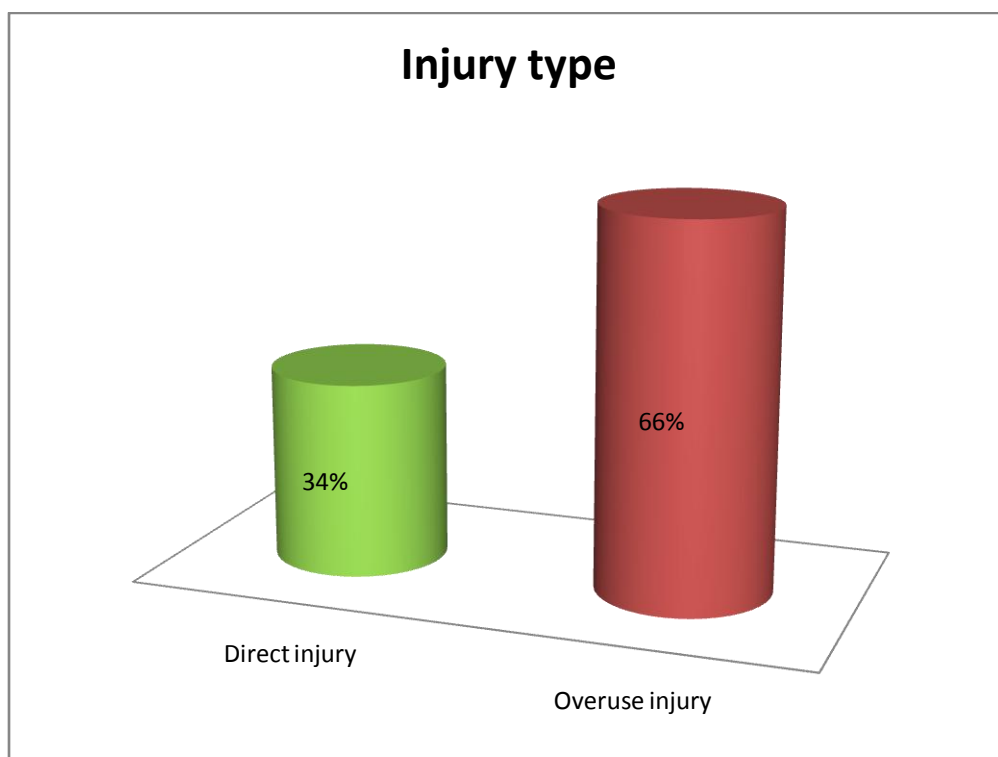


Figure 10: Type of injury

4.3.3 Recurrence of the injury among participants

The bar graph indicates, among all the participants 56% (n=28) have history of recurrence and 44% (n=22) do not (Figure 11).

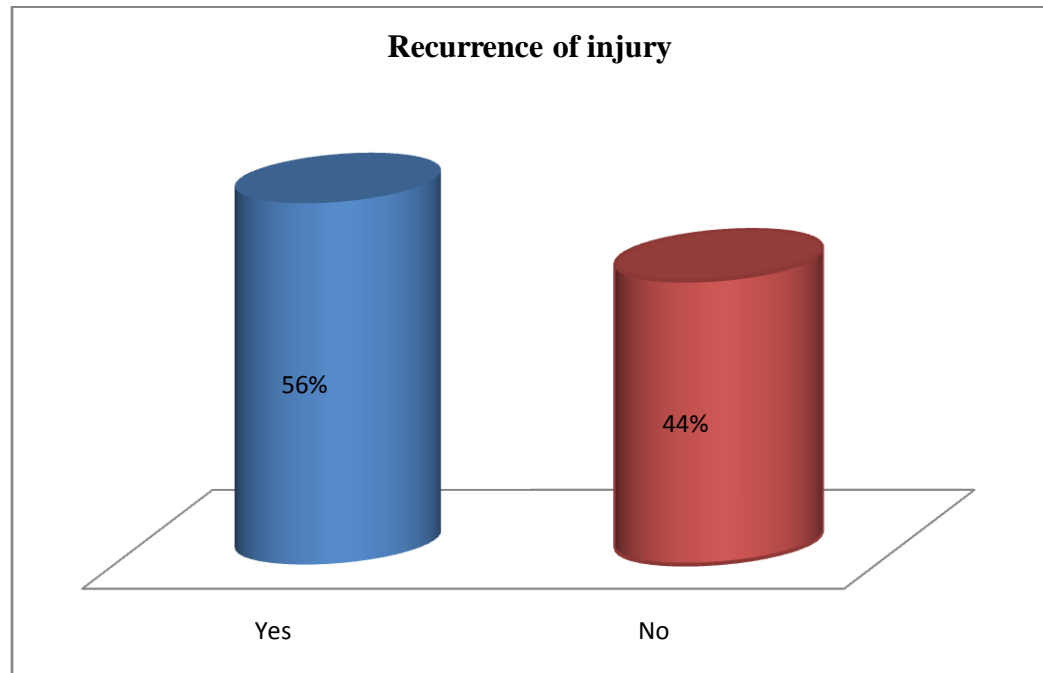


Figure 11: Percentage of recurrence among the participant

4.3.4 Warm up cool down activity of the participants

50 Female participants of BKSP 98% (n=49) were regularly attended in warm up and cool down activity (Figure 12).

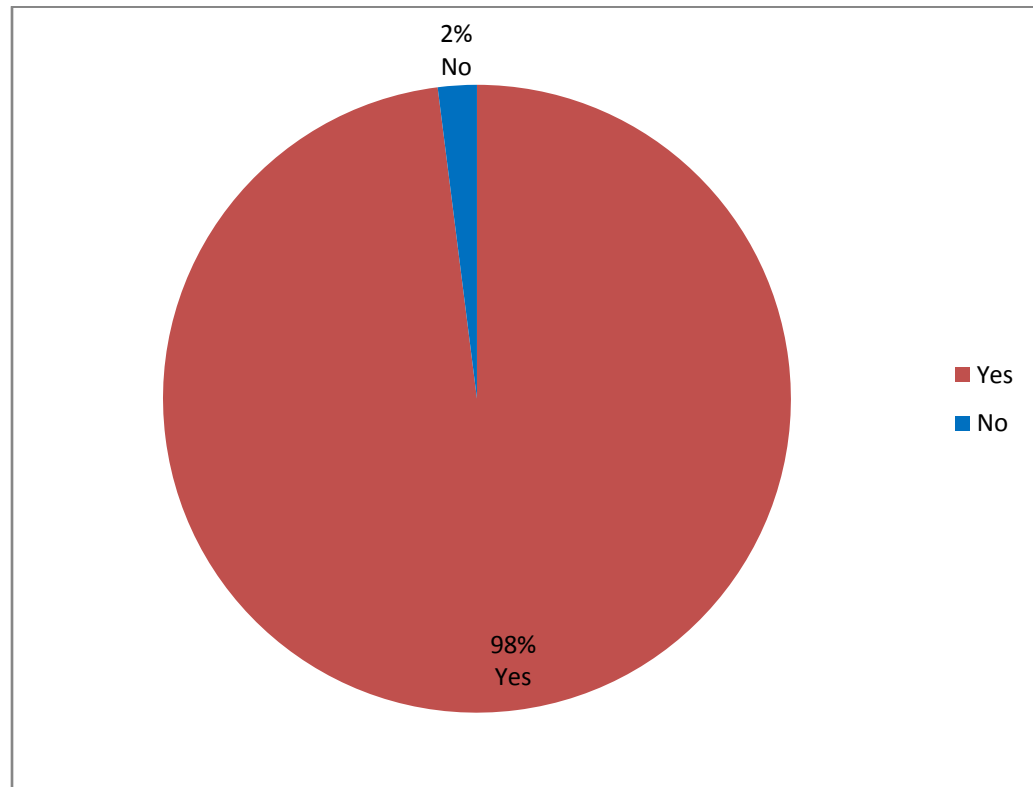


Figure 12: Warm up and cool down activity of the participant

4.3.5 Duration of warm up and cool down

The elevated number of participants 46% (n=23) duration of warm up and cool down activity were 15 minutes or less than 15 minutes, 54% (n=27) were under the duration of 16 minutes or more than 16 minutes (Figure 13).

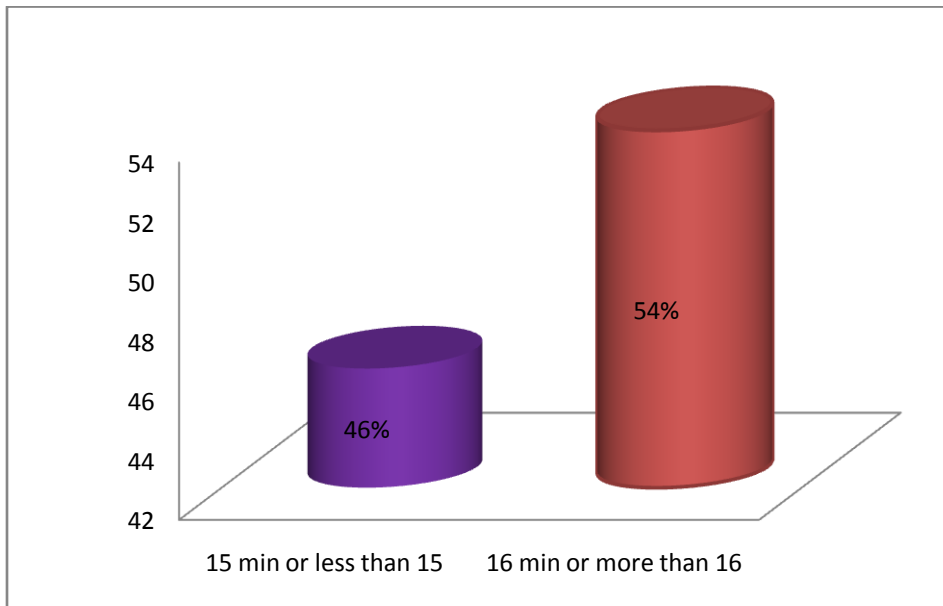


Figure 13: Duration of warm & cool down

4.3.6 Treatment of the participants

Among the injured participants 16% (n=8) took after getting injured and 38% (n=19) took physiotherapy and 23% took both treatment (Figure 14).

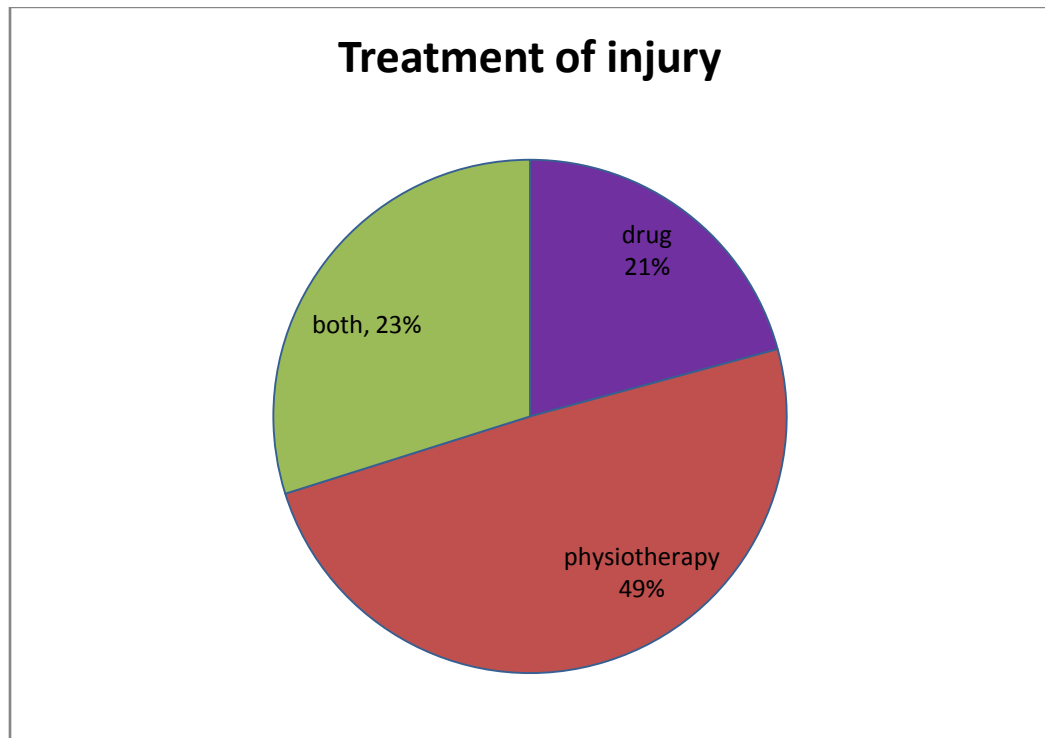


Figure 14: Treatment of injury

In this study age group of injured participants was higher 60% (n=30) who were in 14 years or less than 14 years and 40% (n=20) were in the range of 15 years or more than 15 years. A study was done in 350 female athletes were found 80% of female who play sports get hurt at the age range of 12-15 years, and about 86% female athletes were at the age range of 16-19 and their injuries are classified as serious (Petrie, 2006). So, female athletes over 15 years are vulnerable for incidence of injury.

The highest number of injured participants 26% (n=13) were cricket trainee, in swimming, gymnastic and running equal percent 16% (n=8) of injured trainee, in shooting 14% (n=7), 6% (n=3) percent injured trainee are in archery, and in other sports 6% (n=3) trainee injured. A study named 'Exertion injury of female athlete' that most participants, 48.5% number of injury occur in track and field events which includes running, long jump, high jump and skipping, 12.8% injury occur in jogging, 3.6% in gymnastics, 3.2% in swimming, shooting 2.1% (Orava et al., 2011).

Among the 50 participants who are injured, in this study higher number of injured participants undergo less than or equal 5 years 98% (n=49) and 2% (n=1) duration of training is greater than 6 years. In the American Journal of Sports Medicine a study shows that less than 4 year practice session higher rate (55.9%) of injury occurs among 509 female athlete. The elevated number 65%, participants duration of warm up and cool down were more than 16 min and 33.3% were under duration of less than or equal 15 min in this study. Another study shows that 9.1% within 76 participants done warm up-cool down activity to prevent athletic injury (Payne et al., 2007). As mentioned by Roitman et al. (2001) in Sex-Related Injury Patterns Among Selected High School Sports- percentage of shoulder/arm injury (16.3%), hip/thigh/leg injury (18%), ankle/foot injury (14.8%), knee injury (10.8%), face/scalp (8%), trunk injury (6%), head/neck/spine injury (3.2%), injury of forearm/wrist/hand (22.9%). Whereas in this study among all 50 participants higher number 18% (n=9) participants injured by ankle sprain, rotator cuff injury, wrist injury and ACL injury 14% (n=7), PCL injury and Tennis elbow 10% (n=5), 4% (n=2) head and neck injury, hip dislocation

2% (n=1), hamstring strain and quadriceps strain 6% (n=3), 4% (n=2) head and neck injury Tendonachilis rupture 2% (n=1). The performance of female athlete may differ due to individuals' age, fitness, weight, height, BMI, heart rate, posture, eating disorder, menstrual disturbance etc.

This study shows, higher rate of injured athletes 38% (n=19) educational background is in the secondary school certificate, 34% (n=17) were in level of junior school certificate, 14% (n=7) in the higher secondary level, 14% (n=7) injured trainees undergoes primary school certificate level at Bangladesh Krira Shikkha Protisthan. The National Federation of State High School Associations data shows that between 1988 and 1998 participation in girls' high school sports has risen, nearly 40% of the female participants were below graduation level (Powell & Foss, 2000).

Participants of Bangladesh Krira Shikkha Protisthan were most commonly injured by overuse injury 66% (n=33), and others were affected by direct injury 34% (n=17). And all the participant history of recurrence 56% is higher than non recurrence 44%. Orava et al. (2011) found that in Finland, the majority of women athletes overuse injuries occur to adolescents with 45% recurrence and about 45% of occurred to girls, but only 9.5% among the older athletes.

In all 50 participants according to test of flexibility (Seat and reach test), flexibility rate -more than or equal 37cm have higher percentage of 60% (n=30). In a survey of adolescent athletes ratio between flexibility and athletic injury among 320 female athletes that 82.3% injury occur due to lower flexibility rate and injury of female athletes also related with BMI also according that under weight are commonly include in 65% risk of athletic injury (Mechelen et al., 2006). In this study underweight 18% (n=9), normal weight 76% (n=38), overweight 4% (n=2), and obesity 2% (n=1). This study also shows that the participants who have eating disorder 18% (n=9). An experimental study explore that there were more injuries during the ovulatory phase of women with regular cycles (days 10 to 14) than expected 8% injuries direct, 29% observed, 18% expected rate. In contrast, significantly fewer injuries occurred during the follicular phase (days 1 to 9) their 45 injuries, 13% overuse, 32% direct (Arendt &

Dick, 2006). The participants are mostly 16% (n=8) taken drug as treatment after injury, 38% (n=19) participants have taken physiotherapy and 23% taken both treatment. As mentioned by Freddie et al. (2001) female athletes among 1200 trains in England National Federation of Athletics have taken physiotherapy 84% after injury and 26% took conservative or surgical treatment. The differences of treatment ratio between these two studies occur due to different sample size and socio-demographic characteristics.

Limitation of the study was the expected sample size was 236, and the total number of female athlete trainee in BKSP is very small amount. Due to resource constrain researcher was elect to choose just 50 samples which is very small to generalize the result in all over the Bangladesh. There are a few literatures found about injury among female athletes of Bangladesh so it is difficult to compare the study with the other research. In this study only Kira Shikkha Protisthan (BKSP) was the study area to generalize for wider population.

6.1 Conclusion

Bangladesh Krira Shikkha Protisthan is the largest governmental organization aims to explore talents in sports and train them, also give opportunity to play in different national or international competitions. From the perspective of Bangladesh number of female athletes is fewer than abroad. The result of the study indicates participants of Bangladesh Krira Shikkha Protisthan were most commonly affected by indirect injury rather than direct injury. Variation in anatomical body structure (height, weight) and fitness (BMI, flexibility) and training duration were the primary factors of their injury, ankle is the common injured site. One area has been identified through the study, the recurrence of injuries in female athletes influence by eating disorder. The study indicates lower flexibility rate was another risk factor for athletes and the participants who have trained for long duration have less injury rate. The injury risks associated with the nature of the sport, and in BKSP most of the injured athletes' age range is less than or equal 14 year and cricket is the most vulnerable sporting event. Trainees were dependent on physiotherapy rather than drug after injury.

6.2 Recommendation

The researcher proposed the following recommendation to certain authority and Personnel to prevail over limitation: In BKSP the total number of female athlete is very small amount, limitation of sample size researcher did not gather total participants and use convenience sampling consequently the result cannot be generalized in all over the Bangladesh. So for the further proposal it is strongly recommendation to increase sample size and use simple random sampling by include participants from different sports organizations with adequate time to generalize the result in all over the country. And the result of the study demonstrates the frequency of injury among female athletes, characteristics of athletic injury and factors associating injury in female athletes. In this study only prevalence of injury identified it could be more specified if and effectiveness of physiotherapy treatment also done among female athletes which might be play an vital role in improving the professional efficacy.

REFERENCES

- Arendt, E., and Dick, R., (2006). Knee injury patterns among men and women in collegiate basketball and soccer. *The American Journal of Sports Medicine*, 23:694-701.
- Bahr, R., and Holme, I., (2003). Risk factors for sports injuries-a methodological approach. *British Journal of Sports Medicine*, 37:384-392.
- Baily, D.M., (1997). *Research for the Health Professional: A practical guide*, F.A. Davis Company: Philadelphia.
- Baumhauer, J.F., Alosa, D.M., Renstrom, A.F., Trevino, S., and Beynnon, B.A., (2005). Prospective study of ankle injury risk factors. *The American Journal of Sports Medicine*, 23:564-570.
- Beers, M.H., and Robert, B., (2004). Common Sports Injuries, *The Merck Manual of Diagnosis and Therapy*. Merck Research Laboratories, 45(9):1234-37.
- Bowling, A., (1998). *Research Method in Health: Investigating and Health services*, Open University Press: Buckingham.
- Bruker, P. and Khan, K., (2006). *Clinical Sports Medicine*. 3rd ed., Sydney: McGraw-Hill.
- Chan, K.M., (2007). Sports injuries: The Local scene & Physiotherapy, available: <http://sunjil.lib.hku.hk/hkju/view/47/470052.pdf> [accessed on 10 August, 2015].
- Crisp, T., King, J.B. and Allen, A.A., (2001). *Sports injury: Mechanism, prevention & treatment*, Lippincott Williams and Wilkins: Philadelphia.
- Dhillon, M.S., Gary, B., Soni, R.k., Dhilon, H., and Prabhakar, S., (2012). Nature and incidence of upper limb injuries in professional cricket players a prospective observation. *Sports medicine Arthroscopy Rehabilitation Therapy Technology*, doi: 10.1186/1758-2555-4-42.

Dugan, S.A., (2005). Sports-related knee injuries in female athletes: What gives?, *American Journal of Physical Medicine & Rehabilitation*, 84:122–30.

Eirale, C., Tol, J.L., Whiteley, R., Chalabi, H., and Holmich, P., (2013). Different injury pattern in goalkeepers compared to field players: A three-year epidemiological study of professional football. *Journal Science Medicine Sports*, 11(2):44-56.

Evan, R.C., (1994). *Illustrated Essentials in Orthopedic Physical Assessment*, Mosby: Toronto.

Freckleton, G., and Pizzari, T., (2013). Risk factors for hamstring muscle strain injury in sport: a systematic review and meta-analysis. *British Journal of Sports Medicine*, 47(6):351–358.

Freddie, H., David, A. and Stone., (2001). *Sports injuries*, 2nd ed, Lippincot Williams & Wilkins:Philadelphia.

Giza, E., Mithofer, K., Farrell, L., Zarins, B., and Gill, T., (2005). Injuries in women's professional soccer. *British Journal of Sports Medicine*, 39(4):212-216.

Hagen, K.V., Roach, R., and Summers, B., (2000). The sliding stop: a technique of fielding in cricket with a potential for serious knee injury. *British Journal of Sports Medicine*, 34:379-381.

Halabchi, F., Ziaee, V., and Lotfian, S., (2007). Injury profile in women Shotokan karate championships in Iran (2004-2005). *Journal of sports science & medicine*, 6(2):52.

Hall, C.M, and Brody, L.T., (1999), *Therapeutic exercise*, Lippincott Williams and Wilkins: Philadelphia.

Hassabi, M., Mortazavi, S. M. J., Giti, M. R., Mansournia, M. A., and Shapouran, S., (2010). Injury profile of a professional soccer team in the premier league of Iran. *Asian journal of sports medicine*,1(4):201.

Hawkins, R.D., and Fuller, C.W., (2006). Risk assessment in professional football: an examination of accidents and incidents in the 1994 World Cup finals. *British Journal Sports Medicine*, 30:165–170.

Hicks, C.M., (2009). *Research Methods for Clinical Therapist: applied project design and analysis*. Elsevier Health Sciences: London.

Hirst, S.E., Armeau, E., and Parish, T., (2007). Recognize Anterior Cruciate Ligament Injury in female athletes: what every primary practitioner should know, *The internet Journal of Allied Health Sciences and Practice*, 5(1):1-7.

Joshi, J. and Kotwal, P., (1999). *Essential of Orthopedics and Applied physiotherapy*, Churchill Livingstone Private Limited:New Delhi.

Junge, A., Dvorak, J., and Baumann, G. T., (2004). Football injuries during the World Cup 2002. *American Journal Sports Medicine*, 32:23–27.

Kumar, P. and Clark, M., (2002). *Clinical Medicine*,5th ed, Bath Press Limited :UK.

Lee, K., (2012). Cricket Related Maxillofacial Fractures. *Journal of Maxillofacial Oral Surgeon*, 11(2):182-185.

Mechelen, V., Twisk, W., and Moledijk, A., (2006). Subject-related risk factors for sports injuries: a 1-year prospective study in young adults, *Medical Science Sports Exercise*, 28:1171–1179.

Merlino, J., and Perisa, J., (2012). Low back pain in a competitive cricket athlete. *The International Journal of Sports Physical Therapy*, 7(1):101-108.

Nadler, F.S., Malanga, G.A., Depriece, M., Stitik, P.T., and Feinberg, H.J., (2010). The Relationship Between Lower Extremity Injury, Low Back Pain and Hip Muscle Strength in Male and Female Collegiate Athletes, *Clinical Journal of Sports Medicine*, 10:89-97.

Orava, S., Hulkko, A., and Jormakka, E., (2011). Exertion injury among female athletes, *British Journal of Sports Medicine*, 15(4):229-33.

Orchard, J.W., (2013). Injury surveillance in cricket. *British Journal of Sports Medicine*, doi: 10.1136/bjsports-2012-092138.

Orchard, J.W., James, T., and Portus, M.R., (2006). Injuries to elite male cricketers in Australia over a 10-year period. *Journal of Science and Medicine in sports*, 9(6):459-467.

Otis, C.L., Drinkwater, B., Johnson, M., Loucks, A.B., and Wilmore, J., (2005). ACSM Position Stand: The Female Athlete Triad. *American College of Sport Medicine*, 29:19.

Payne, K., Berg, K., and Latin, R., (2007). Ankle injuries and ankle strength, flexibility and proprioception in college basketball players. *Journal Athletic Training*, 32:221–225.

Pecina, M.M. and Bojanic, I., (2007). *Overuse injuries of the musculoskeletal system*, 2nd ed, Croat Publishers Limited: Boca Raton.

Peterson, L. and Renstrom, P., (2001). *Sports injury and their prevention & treatment*, Martin Dunitz Limited: London.

Petrie, T (2006). Disordered eating in female collegiate gymnasts: prevalence and personality/attitudinal correlates, *Journal of Sport and Exercise Psychology*, 15:424-436.

- Powell, J.W., and Foss, B.K.D., (2000). Sex-Related Injury Patterns Among Selected High School Sports, *The American Journal of Sports Medicine*, 28(3):385-46.
- Restolainen, H.A., Waller, B., Kujala, U.M., and Kettunen, J.A., (2009). Gender differences in sports injury risk and types of injuries: a retrospective twelve-month study on cross country skiers, swimmers, long- distance runners and soccer players. *Journal of Sports Science and Medicine*, 8:443-451.
- Roitman, J.I., Haver, E.J., and Herridge, M., (2001). *American College of Sports Medicines Resource Manual: for guidelines for exercise testing*, 19:33- 44.
- Shadanfar, K., (2011). Sex-Related Injury Patterns among Iranian Professional Handball Players. *Journal of Applied Environmental Biological Science*, 1(9):329–336.
- Sherman, R., Thompson, R., and Rose, J., (2009). Body mass index and athletic performance in elite female gymnasts. *Journal of Sport Behavior*, 19:338-44.
- Spreeyn, P.N., (1985). *Sports and medicine*, 2nd ed, Robert Hartnoll Limited:Sydney.
- Templeton, C.N., Reed, V.A., Campbell, S.E., and Beecher, M.D., (2012). Spatial movements and social networks in juvenile male song sparrows. *Behavioral Ecology*, 23:141-152.
- Trog, J.S., Welsh, R.P., and Shephard, R.J., (2005). Incidence and severity of high school athletic injuries. *Journal of Athletic Training*, 25:344–449
- Whieldon, T.J. and Cerny, F.J., (1990). *Incidence and severity of high school athletic* Wilkins:Philadelphia.
- Wojtys, M.D., Laura, J., Huston, M.S., Edward, M., Thomas, N., Lindenfeld, Timothy E., Hewett., and Mary, V.H., (2008). Association Between the Menstrual Cycle and Anterior Cruciate Ligament Injuries in Female Athletes. *The American Journal of Sports Medicine*, 26(5):614-19.

Yoo, J.H., Lim, B.O., and Ha, M., (2010). A meta-analysis of the effect of neuromuscular training on the prevention of the anterior cruciate ligament injury in female athletes, *Knee Surgery Sports Trauma Arthroscopy*,18:824-30.

Yoon, Y.S., Chai, M., and Shin, D.W., (2004). Football injuries at Asian tournaments *American Journal of Sports Medicine*, 321:36–42.

Zelisko, J.A., Noble, H.B., and Porter, M., (2008). A comparison of men's and women's professional basketball injuries, *American Journal of Sports Medicine*, 10(5):297-99.

CONSENT FORM (English)

(Please read out to the participant)

Assalamualaikum/Namasker, my name is Sumaiya Nasrin Bristi, I am conducting this study for a B. sc in Physiotherapy project study dissertation titled **“Prevalence of sports injuries among female athletes”** under Bangladesh Health Professions Institute (BHPI), University of Dhaka. I would like to know about some personal and other related information regarding common sports injuries among female athletes. This will take approximately 15-20 minutes.

I would like to inform you that this is a purely academic study and will not be used for any other purpose. The researcher is not directly related with this BKSP, so your participation in the research will have no impact on your present or future training session. All information provided by you will be treated as confidential and in the event of any report or publication it will be ensured that the source of information remains anonymous. Your participation in this study is voluntary and you may withdraw yourself at any time during this study without any negative consequences. You also have the right not to answer a particular question that you don't like or do not want to answer during interview.

If you have any query about the study or your right as a participant, you may contact with me, and/or S.M. Ferdous Alam, Assistant Professor, Department of Rehabilitation Science, BHPI, CRP, Savar, Dhaka-1343.

Do you have any questions before I start?

So, may I have your consent to proceed with the interview?

Yes No

Signature of the participant _____ Date _____

Signature of the Interviewer _____ Date _____

Signature of the witness _____ Date _____

সম্মতিপত্র

আসসালামুআলাইকুম/নমস্কার,

আমার নাম সুমাইয়া নাসরিন বৃষ্টি, আমি এই গবেষণা প্রকল্পটি বাংলাদেশ হেলথ প্রফেশন্স ইন্সটিটিউট (বিএইচপিআই)-এ পরিচালনা করছি যা আমার ৪র্থ বর্ষ বি এসসি ইন ফিজিওথেরাপী কোর্সের অধিভুক্ত। আমার গবেষণার শিরোনাম হল- মহিলা ক্রীড়াবিদদের খেলাধুলা জনিত আঘাতের হার। আমি এক্ষেত্রে আপনাকে কিছু ব্যক্তিগত এবং আনুষঙ্গিক প্রশ্ন করতে চাচ্ছি। এতে আনুমানিক ১০-১৫ মিনিট সময় নিব।

আমি আপনাকে অনুগত করতে চাচ্ছি যে, এটা আমার অধ্যয়নের অংশ এবং যা অন্য কোন উদ্দেশ্যে ব্যবহৃত হবেনা। গবেষক সরাসরি এই অধ্যয়নের সাথে অন্তর্ভুক্ত নয়। তাই এই গবেষণায় আপনার অংশগ্রহণ বর্তমান ও ভবিষ্যৎ চিকিৎসায় কোন প্রকার প্রভাব ফেলবেনা। আপনি যেসব তথ্য প্রদান করবেনতার গোপনীয়তা বজায় থাকবে এবং আপনার প্রতিবেদনের ঘটনা প্রবাহে এটা নিশ্চিত করা হবে যে এই তথ্যের উৎস অপ্কাশিত থাকবে।

এই অধ্যয়নে আপনার অংশগ্রহণ স্বেচ্ছা প্রণোদিত এবং আপনি যে কোন সময় এই অধ্যয়ন থেকে কোন নেতিবাচক ফলাফল ছাড়াই নিজে থেকে প্রত্যাহার করতে পারবেন। এছাড়াও কোন নির্দিষ্ট প্রশ্ন অপছন্দ হলে উত্তর না দেয়ার এবং সাক্ষাৎকারের সময় কোন উত্তর না দিতে চাওয়ার অধিকার ও আপনার আছে।

এই অধ্যয়নে অংশ গ্রহণকারী হিসেবে যদি আপনার কোন প্রশ্ন থাকে তাহলে আপনি আমাকে অথবা/এবং এস. এম. ফেরদৌসআলম, সহকারী অধ্যাপক, রিহ্যাবিলিটেশন সাইন্স বিভাগ, বিএইচপিআই, সিআরপি, সাভার, ঢাকা- ১৩৪৩-তে যোগাযোগ করতে পারেন।

সাক্ষাৎকার শুরু করার আগে আপনার কি কোন প্রশ্ন আছে?

আমি আপনার অনুমতি নিয়ে এই সাক্ষাৎকার শুরু করতে চাচ্ছি।

হ্যাঁ

না

১। অংশগ্রহণকারীর স্বাক্ষর.....

২। সাক্ষাৎগ্রহণকারীর স্বাক্ষর.....

৩। সাক্ষীর স্বাক্ষর.....

Questionnaire

Id no:	
Name:	Address:
Mob no:	

Part 1: Sociodemographic Questions

SL No.	Questions	Responses
1.	Age	_____years
2.	Education	Primary School Certificate (PSC)= 1 Junior School Certificate (JSC)= 2 Secondary School Certificate (SSC)= 3 Higher Secondary Certificate (HSC)= 4 Other (Specify)= 5
3.	Training event	Cricket =1 Football=2 Archery= 3 Running= 4 High Jump=5 Long Jump= 6 Swimming= 7 Shooting=8 Gymnastic=9 Tennis= 10 Other (Specify)= 11
4.	Duration of training	Less than 1yr=1 1yr=2 2yr=3 3yr=4 4yr=5 5yr=6 6yr=7 7yr=8 Other (Specify)=9

Part 2: Health related questions

SL No.	Questions	Responses
5.	Height	_____meter
6.	Weight	_____ kg
7.	BMI(According to WHO) Underweight= <18.5 Normal weight= 18.5-24.9 Over weight =25-29.9 Obesity= 30 or greater	Underweight= 1 Normal weight= 2 Over weight=3 Obesity=4
8.	Heart rate	_____beat/min
9.	Posture(Palm line scale)	Lordosis=1 Kyphosis=2 Scoliosis=3 Normal curvature=4
10.	Flexibility(Sit and Reach test)	_____cm
11.	Presence of eating disorder	Yes=1 No=2
12.	Duration of eating disorder	__dd / __mm / __yy
13.	Presence of menstrual disturbance	Yes=1 No=2
14.	Duration of menstrual disturbance	__dd / __mm / __yy

Part 3: Injury related questions

SL NO	Questions	Responses
15.	Name of injury	Head & Neck injury =1 Rotator cuff injury =2 Shoulder dislocation =3 Tennis elbow =4 Wrist injury =5 Fracture of upper limb=6 Hip dislocation =7 Hamstring strain =8 Quadriceps strain =9 Meniscus injury=10 Anterior crutiate ligament injury=11 Posterior crutiate ligament injury =12 Stress fracture of tibia =13 Fracture of lower limb=14 Ankle sprain=15 Great toe and/or other finger fracture=16 Tendonachilis rupture=17 Planter fasciitis =18
16.	Type of injury	Direct(Traumatic)=1 Indirect(Overuse)=2
17.	Severity of injury	Mild=1 Moderate=2 Severe=3
18.	Nature of pain (According to VAS scale)	
19.	Recurrence of injury	Yes=1 No=2
20.	How times	_____times

21.	Warm up & cool down activity	Yes=1 No=2
22.	Duration of warm up & cool down	_____Min
23.	Treatment	Drug=1 Physiotherapy=2 Both drug & physiotherapy=3
24.	Improvement	<u>Drug</u> No Improvement =1 50% Improvement=2 75% Improvement=3 100% Improvement=4 <u>Physiotherapy</u> No Improvement =1 50% Improvement=2 75% Improvement=3 100% Improvement=4 <u>Both drug & physiotherapy</u> No Improvement =1 50% Improvement=2 75% Improvement=3 100% Improvement=4

Permission letter

August 19, 2015

Head

Department of Physiotherapy

Centre for the Rehabilitation of the Paralysed (CRP)

Savar, Dhaka-1343

Through: Head, Department of Physiotherapy, BHPI.

Subject: Seeking permission for data collection to conduct my research project.

Dear Sir,

With due respect and humble submission to state that I am Sumaiya Nasrin Bristi, student of 4th Professional B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). The ethical research committee has approved my research project titled on **“Prevalence of sports injuries among female athletes”** under supervision of S. M. Ferdous Alam, Lecturer, Department of Physiotherapy, BHPI. Conducting this research project is partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. I want to collect data for my research project from the athletes of BKSP. So, I need permission for data collection from the Exercise Physiology department of BKSP. I would like to assure that anything of my study will not be harmful for the participants.

I, therefore, pray & hope that you would be kind enough to grant my application & give me permission for data collection and oblige thereby.

Sincerely Yours

Sumaiya Nasrin Bristi

Recommended for
permission
19.08.15

Sumaiya Nasrin Bristi

4th Professional B.Sc. in Physiotherapy

Roll-30, Session: 2010-2011

Bangladesh Health Professions Institute (BHPI)

CRP-Chapain, Savar, Dhaka-1343.



বাংলাদেশ ক্রীড়া শিক্ষা প্রতিষ্ঠান

BANGLADESH KRIRA SHIKSHA PROTISHTAN
জিরানী, অশুলিয়া, ঢাকা। ZIFRANI, ASHULIA, DHAKA-1349
Tel : 00-88-02-7789215-6, Fax : 00-88-02-7789513
E-mail : bksp1983@yahoo.com, Web : www.bkspbd.org

নং- বিকেএসপি/ক্রীড়া বিজ্ঞান-০৪২-১৪-৪৩-৬২

তারিখ : ৮ আশ্বিন ১৪২২
২৩ সেপ্টেম্বর ২০১৫

প্রাপক : মোঃ ওবায়দুল হক

সহযোগী অধ্যাপক ও বিভাগীয় প্রধান
ফিজিওথেরাপি বিভাগ, বাংলাদেশ হেলথ প্রফেশনাল ইনস্টিটিউট
(বিএইচপিআই), সিআরপি, ঢাকা।

বিষয় : বিএসসি ইন ফিজিওথেরাপি কোর্সে রিসার্চ সংক্রান্ত তথ্য গ্রহন এসঙ্গে।

সূত্র : সিআরপি-বিএইচপিআই/০৯/১৫/৬১৯৬, তারিখ : ১৭-০৯-২০১৫ইং


মহোদয়,

উপর্যুক্ত বিষয় ও সূত্রের প্রেক্ষিতে জানানো যাচ্ছে যে, আগামী ০১/১০/২০১৫ থেকে ২০/১১/২০১৫ইং পর্যন্ত নিম্নে বর্ণিত শিক্ষার্থীদের রিসার্চ সংক্রান্ত তথ্য গ্রহণের নিমিত্তে বিকেএসপি কর্তৃপক্ষের সম্মতি জ্ঞাপন করা হল। উল্লেখ্য উক্ত সময়ে অত্র প্রতিষ্ঠানের কোন যন্ত্রাংশের ক্ষতি সাধিত না হয় সেদিকে সজ্ঞার দেয়ার জন্য এবং যাবতীয় নিয়ম কানুন মেনে চলার জন্য অনুরোধ করা হল।

১. সৌরভ কান্তি দে
২. সুমাইয়া নাসরিন বৃষ্টি
৩. মাহমুদা আরফিন

অনুলিপি : (সদয় অবগতির জন্য)

- ১। মহাপরিচালক মহোদয় বিকেএসপি।
- ২। পরিচালক (প্রশিক্ষণ), বিকেএসপি।
- ৩। অধ্যক্ষ, বিকেএসপি।
- ৪। নিয়ন্ত্রণ কর্মকর্তা, বিকেএসপি।
- ৫। সংশ্লিষ্ট নথি।


২৩/০৯/২০১৫

নুসরাৎ শারমিন
উপ-পরিচালক (ক্রীড়া বিজ্ঞান) অ. দাঃ
বিকেএসপি।